teen mice were found in the 131 stomachs, and in no case did any stomach contain the remains of more than one. The crow, on the other hand, not only preys upon mice and other small mammals, but even captures young rabbits and eats many snakes, young turtles, salamanders, frogs, toads and fish. The crow also eats many crayfish and other smaller crustaceans which do not appear in the rook's bill of fare.

In the matter of vegetable food the rook does not seem to indulge in any great variety in April, May and June, but probably the other months would show many additions to the list. The crow eats about every kind of grain that the country produces, besides fruit and acorns or other mast. The crow appears to be far more omniverous than the rook; in fact, it seems doubtful if there is anything eatable that a crow will not eat, while, as far as shown, the rook seems quite exclusive.

In the comparison of these two birds the evidence appears to be in favor of the rook, although the economic difference is not great.

The proportion of harmful insects is somewhat greater with the rook, and its vegetable food does not include so many items of useful grains as with the crow. It is not possible, however, to come to any very definite conclusion until more stomachs of the rook shall have been examined, covering the other months of the year.

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AN INVESTIGATION WITH RÖNTGEN RAYS, ON GERMINATING PLANTS.

THE marked attention which the Röntgen or X-rays are receiving from investigators of this and other countries, and the popular excitement felt in the investigations, render all papers on this subject of particular interest.

The first record of experiments with these rays in their effect on plants known to the writer is a recent article by Alfred Schober presented to the German Botanical Society.* Schober was led to the investigation by the similarity between X-rays and ultra violet light, which was pointed out by Röntgen in his first paper. The subject appeared particularly worthy of investigation, as Sachs had shown that heliotropic curving is incited in plants by blue, violet and invisible ultra violet rays in about an equal degree with full white light; while the red, yellow and green parts of the spectrum are apparently inactive.

Rothert, in his very extensive work on heliotropism, found the cotyledo† of germinating oat plants to be particularly sensitive to the action of light, and these were thus selected for the experiment. Vigorous plants germinated in full light, with cotyledos from 1 to 2 centimeters long, were selected and set in damp sand in a dark box, the walls of which were about 1 centimeter thick and blackened on both sides. A Hittorf's tube was placed at one end of this box at the height of the seedlings and about one centimeter distant from the box. The seedlings were arranged at one end of the box so that they were about 2 centimeters distant from the tube. The inductor had a spark length of about 12 centimeters, and was kept at its highest capacity during the experiment. A photograph of a hand could have been taken under the same conditions at a distance of 30 centimeters in five minutes.

The plants were first exposed to the action of the rays for 30 minutes, after which an examination showed that no ap-

* Schober, Alfred, 'Ein Versuch mit Röntgenschen Strahlen auf Keimpflanzen.' Berichte d. Deut. Bot. Gesellsch. Bd. 14, Heft 3 (April, 1896), p. 108.

† *Cotyledo* is a term introduced by Rothert (Cohns' Beiträge zur Biol. der Pflanzen, Bd. 7, p. 25) to designate the leaf-like organ of the form of an almost cylindrical closed sheath which appears first after the roots in the germination of grass seeds.

parent effect had been produced. The box was then closed and the exposure continued for another half hour. A careful examination at the end of this time led to the conclusion that no visible effect had been produced. It was found impracticable to continue the experiment longer, as the tube in this time had become excessively heated.

After the experiment was concluded the plants used were proved to be normally sensitive, as an exposure of one hour to diffused daylight, passed through a small horizontal slit, resulted in a noticeable curvature which in four hours had reached 60° from the vertical.

As the inductor was excited to its greatest capacity during the experiment, the plant being placed in as close proximity to the light as possible—and as after the experiment the plants were found to be normally sensitive, showing noticeable curvature on an equal exposure to diffuse white light—the author concludes that the new rays appear to differ from light in that they do not stimulate heliotropic curvature.

This contribution to our understanding of the action of the X-rays on plants is very interesting, but it is not thoroughly satisfactory. While light induces a noticeable curvature on certain plants in one hour, the X-rays may not be so active. Until it is possible to expose the plant to the action of the X-rays for a longer time we are not justified in concluding that they have no power to induce heliotropic curvature.

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CURRENT NOTES ON PHYSIOGRAPHY.

GREAT VALLEY OF CALIFORNIA.

F. L. Ransome discusses the heavy cover of fluviatile sediments, at least 2000 or 3000 feet thick, that form the floor of the Great Valley of California, in their bearing on the theory of isostacy (Bull. Dept. Geol., Univ. Cala., i, 1896, 371). Although chiefly concerned with geological problems, the essay gives a good general description of this typical fluviatile plain, dividing it into three sections, two of which are drained by the Sacramento and San Joaquin rivers, while the third sheds its waters into Tulare lake, of intermittent overflow. The great flat fans built forward by the larger streams from the Sierra are recognized as controlling the unsymmetrical position of the main rivers. The Sacramento and Feather rivers are said to 'pursue a winding course on low ridges;' this unsatisfactory and exaggerative term, 'low ridges,' being quoted from the Marysville folio, U. S. Geol. Atlas, to name the very faintly convex flood plains built by the rivers themselves. The smaller streams from the mountains "seldom reach the Sacramento directly, but are lost in the intricate plexus of sloughs which meander through the tule (reed) lands bordering the main river." A similar study of the Po in its relation to the Alps and Apennines would probably bring out many resemblances between these great fluviatile depositories of mountain waste.

NORWEGIAN COAST PLAIN.

An instructive account, by Richter, of his studies last summer concerns the Norwegian coast plain (Globus, lxix., 1896, 313), on which Reusch has already given a brief report (Norg. geol. Undersög., 1894, with map; Chicago Journ. Geol., ii., 1894, 347). The coast plain, not to be confused with ordinary coastal plains of uplifted marine sediments, is wave cut in solid rock with little regard to structure, and is terminated landward by an abrupt ascent to the highlands. The visible breadth of the plain varies greatly, depending first on its original exposure to the waves, and hence having greater expansion on the ocean front and weakening to a mere strandline or disappearing entirely in the fiords; second,